

CLAIMS

What is claimed is:

- 5 1. An apparatus for determining time remaining for fluid flow at a temperature from a fluid outlet which receives fluid from a fluid source, comprising:
- a first temperature sensor for sensing fluid temperature at a fluid outlet;
- a second temperature sensor for sensing fluid temperature at a fluid source;
- a communication link; and
- 10 a controller in communication with said first temperature sensor and said second temperature sensor via said communication link, for comparing sensed fluid temperatures to determine time remaining for fluid flow at a temperature.
2. The apparatus of claim 1 wherein said communication link comprises a wireless
- 15 communication link.
3. The apparatus of claim 2 wherein said wireless communication link comprises a radio frequency communication link.
- 20 4. The apparatus of claim 1 wherein said communication link comprises a hardwire communication link.
5. The apparatus of claim 1 wherein said first temperature sensor comprises an integrated circuit temperature sensor.
- 25 6. The apparatus of claim 1 wherein said first temperature sensor comprises a thermocouple.

7. The apparatus of claim 1 wherein said first temperature sensor comprises a sensor system comprising:

a temperature sensor;

5 a radio frequency transmitter;

a power supply; and

a housing enclosing said temperature sensor, radio frequency transmitter, and power supply for protection from the environment.

10 8. The apparatus of claim 7 wherein said sensor system further comprises a sleeve for placement in line with fluid flow to a fluid outlet.

9. The apparatus of claim 1 wherein said second temperature sensor comprises an integrated circuit temperature sensor.

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10. The apparatus of claim 1 wherein said second temperature sensor comprises a thermocouple.

20 11. The apparatus of claim 1 wherein said second temperature sensor comprises a sensor system comprising:

a temperature sensor;

a radio frequency transceiver;

a power supply; and

25 a housing enclosing said temperature sensor, radio frequency transceiver, and power supply for protection from the environment.

12. The apparatus of claim 1 further comprising a display device for relaying information to a user.

13. The apparatus of claim 12 wherein said display device is in communication with said first
5 temperature sensor and said controller.

14. The apparatus of claim 13 wherein said display device comprises:
a display;
a radio frequency transceiver; and
10 a power supply.

15. The apparatus of claim 12 wherein said display device comprises an audio device.

16. The apparatus of claim 1 wherein said controller comprises a device selected from the
15 group consisting of EEPROMs, microcontrollers, and microprocessors.

17. A method of determining time remaining for fluid flow at a temperature from a fluid outlet
which receives fluid from a fluid source, the method comprising:
providing temperature sensors at a fluid outlet and fluid source;
20 providing a controller;
sensing fluid temperature at the fluid outlet and fluid source;
communicating sensed fluid temperatures to the controller; and
determining time remaining for fluid flow at a temperature from the fluid outlet
with the controller based upon sensed fluid temperatures.

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18. The method of claim 17 wherein the step of communicating sensed fluid temperatures to the controller comprises communicating sensed fluid temperatures to the controller via a communication link selected from the group consisting of wireless communication links and hardwire communication links.

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19. The method of claim 18 wherein the step of communicating sensed fluid temperatures to the controller via a wireless communication link comprises:

sensing temperature at the fluid outlet;

converting the sensed temperature to a radio frequency signal;

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transmitting the radio frequency signal; and

receiving the transmitted radio frequency signal at a receiver in communication

with the controller.

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20. The method of claim 17 further comprising the step of displaying time remaining for fluid flow at a temperature from a fluid outlet on a display.

21. The method of claim 20 wherein the step of displaying time remaining for fluid flow at a temperature from a fluid outlet on a display comprises:

converting time remaining information from the controller to a radio frequency

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signal; and

transmitting the time remaining radio frequency signal to a receiver in

communication with a display.

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22. The method of claim 17 further comprising the step of displaying fluid outlet temperature on a display.

23. The method of claim 22 wherein the step of displaying fluid outlet temperature on a display comprises:

converting sensed fluid outlet temperature to a radio frequency signal; and
transmitting the fluid outlet temperature signal to a receiver in communication

5 with a display.

24. The method of claim 17 further comprising the step of audibly indicating the time remaining for fluid flow at a temperature from a fluid outlet.

10 25. A method of determining time remaining for fluid flow at a temperature from a fluid outlet which receives fluid from a fluid source, the method comprising:

sensing fluid temperature at a fluid outlet;
sensing fluid temperature at a fluid source;
comparing at least two sensed fluid temperatures; and

15 determining time remaining for fluid outlet flow at a temperature based upon the comparing step.

26. The method of claim 25 wherein the step of comparing at least two sensed fluid temperatures comprises subtracting a previously sensed temperature from a later sensed temperature.

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27. The method of claim 25 wherein the step of comparing at least two sensed fluid temperatures comprises determining a rate of temperature change from at least two sensed fluid source temperatures.

28. The method of claim 27 wherein the step of determining time remaining for fluid outlet flow at a temperature comprises:

comparing a sensed fluid outlet temperature to a sensed fluid source temperature; and

5 determining time remaining for fluid outlet flow at a temperature based upon the comparison between a sensed fluid outlet temperature and sensed fluid source temperature and the rate of temperature change.

29. A method of determining time remaining for fluid flow at a temperature from a fluid outlet which receives fluid from a fluid source, the method comprising:

providing a fluid outlet fluid temperature;

sensing fluid temperature at a fluid source;

comparing at least two fluid temperatures; and

determining time remaining for fluid outlet flow at a temperature based upon the

15 comparing step.